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(12) **United States Patent**
Itou

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(54) **ULTRAHIGH-PRESSURE SEALING DEVICE
AND RECIPROCATING PUMP**

(56) **References Cited**

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See application file for complete search history.

(57) **ABSTRACT**

An ultrahigh-pressure sealing device improves sealing performance under ultrahigh pressures and improves durability. The ultrahigh-pressure sealing device is arranged to seal an annular space between an outer member and an inner member and separates between a high-pressure chamber and a low-pressure chamber. A bottom ring includes a first inner periphery, a first large-diameter outer periphery, a first small-diameter outer periphery, and a first middle outer periphery. A back-up ring includes a second inner periphery, a second engagement portion, and a second outer periphery. A packing ring includes a third low-pressure-chamber end, a third inner periphery, a third large-diameter outer periphery, a third the small-diameter outer periphery, and a third middle outer periphery. An elastic ring includes a fourth inner periphery, a fourth the engagement portion, and a fourth outer periphery.

18 Claims, 7 Drawing Sheets

